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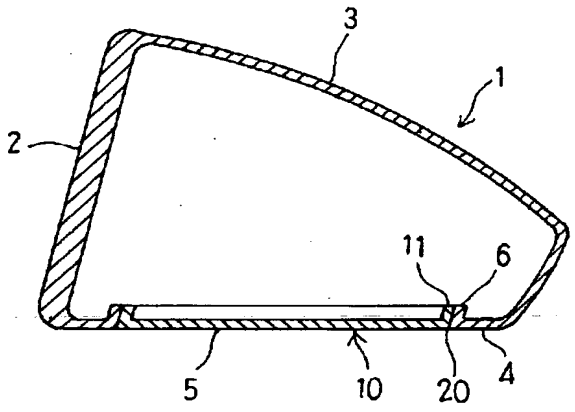
(54)【発明の名称】　ゴルフクラブヘッド

(57)【要約】
【課題】　強度を必要としない部分の肉厚を極力薄くし、ヘッドの大型化を図り、確実な溶接を可能とする。
【解決手段】　クラウン部３又はソール部５の所定区域を除いた金属製のヘッド本体１に上記所定区域を形成する金属製の別体部材１０を溶接して形成されるウッド系のゴルフクラブヘッドにおいて、ヘッド本体１の別体部材１０が溶接される個所の周縁部６と別体部材１０の周縁部１１との肉厚をフェース部２を除く周縁部６，１１以外の肉厚よりも厚く形成した。



【特許請求の範囲】
【請求項１】　クラウン部又はソール部の所定区域を除いた金属製のヘッド本体に上記所定区域を形成する金属製の別体部材を溶接して形成されるウッド系のゴルフクラブヘッドにおいて、
ヘッド本体の別体部材が溶接される個所の周縁部と別体部材の周縁部との肉厚をフェース部を除く周縁部以外の肉厚よりも厚く形成したことを特徴とするゴルフクラブヘッド。
【請求項２】　ヘッド本体を形成する金属材料がアルミニウムの合金であり、ヘッド体積が２７０cc以上であることを特徴とするゴルフクラブヘッド。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】この発明は、ウッド系の金属製ゴルフクラブヘッドに関する。
【０００２】
【従来の技術】ウッド系の金属製ゴルフクラブヘッドは、メタルウッドあるいはメタルヘッドと呼ばれ、今やパーシモンヘッドに替わって主流をなし、使用する材料としては、ステンレススチール，チタニウムやその合金，アルミニウムやその合金であるジュラルミン等多種類にわたり、複数の材料を用いたコンポジットタイプのヘッドも存在する。また、製造方法としては、ロストワックス（精密鋳造）法と鍛造法が主として用いられ、通常ソール部分とその他の本体部分とを別体に製造し、ソール部分の周縁部を本体部分に溶接するという手法が一般的に用いられている。
【０００３】最近のメタルヘッドは、大型化がすすみ、このヘッドの大型化は、スイートエリアを拡大し、芯を外してボールを打っても飛距離の減少を少なくするとともに、重心深度を深め、慣性モーメントを大きくするのに役立ち、易しく打てるクラブとなり、平均飛距離の増大と方向性を良くしている。ヘッドを大きくしてもヘッド重量が増大してしまうと、一般ゴルファーにとっては到底振り切ることができず、コントロールもしにくくなる。そのため、軽量化が必要であるが、この軽量化には比重が２．７～２．８と小さいアルミニウムの合金等の金属材料によってヘッド全体を形成することが最適である。
【０００４】
【発明が解決しようとする課題】全体をアルミニウム合金で大型ヘッド、特に体積が２７０cc以上もの大型ヘッドを製造する場合、打撃面であるフェース部は最低限４．５㎜の厚みを要するが、残余のクラウン部およびソール部は１．２㎜以下、さらには０．８㎜以下の薄肉をもって成型する必要がある。この場合通常のロストワックス法を用いて成型する場合、ヘッドのソール部に所定区域を欠いた空所を有するヘッド本体とこれとは別体に準備した空所を閉じるための別体部材を溶接し一体化する必要があるが、ヘッド本体と別体部材との溶接部分を上記のような厚さにすると溶接のヒケによる割れが溶接位置近傍に生じ易くなるという欠点がある。
【０００５】そこで、この発明は、強度を必要としない部分の肉厚を極力薄くし、ヘッドの大型化を図り、確実な溶接を可能にしたゴルフクラブヘッドを提供することを目的とする。
【０００６】
【課題を解決するための手段】上述の目的を達成するため、この発明は、クラウン部又はソール部の所定区域を除いた金属製のヘッド本体に上記所定区域を形成する金属製の別体部材を溶接して形成されるウッド系のゴルフクラブヘッドにおいて、ヘッド本体の別体部材が溶接される個所の周縁部と別体部材の周縁部との肉厚をフェース部を除く周縁部以外の肉厚よりも厚く形成したものである。
【０００７】
【発明の実施の形態】以下に、この発明の好適な実施例を図面を参照にして説明する。
【０００８】図１に示す実施例では、フェース部２とクラウン部３ならびに周辺部４を備えたヘッド本体１と、ソール部５の所定区域を形成する別体部材１０とを有し、ヘッド本体１に別体部材１０を溶接してウッド系の金属製ゴルフクラブヘッドを構成している。ヘッド本体１の別体部材１０が溶接される個所の周縁部６と別体部材１０の周縁部１１との肉厚をフェース部２を除く周縁部６，１１以外の肉厚よりも厚く形成してある。本体部１は、例えばロストワックス法により使用する金属材料を鋳込むことで所望の形状および所望の肉厚に製造することができる。最も強度が要求されるフェース部２の肉厚は厚く、ソール部５の一部やクラウン部３や周辺部４の肉厚は薄く形成してある。
【０００９】図２は、ソール部５側からヘッドを見た図であり、符号２０で示す個所は溶接部であり、符号７はヘッド本体１と一体形成されたホーゼルを示す。ヘッド本体１にホーゼル７が存在しないタイプ、いわゆるシャフトがヘッド本体１に貫通するスルーボアータイプのものであってもよく、あるいはクラウン部３が存在しないものであってもよい。
【００１０】図３に示す実施例は、クラウン部３の所定区域を金属製の別体部材１０としたものを示す。別体部材１０の周縁部１１も他の部分よりも肉厚が厚く形成され、この別体部材１０が溶接される個所の周縁部６も他の部分よりも肉厚が厚く形成されている。
【００１１】図４は、別体部材１０あるいは別体部材１０と溶接されるヘッド本体１の個所の拡大断面を示し、周縁部１１又は６の肉厚t_2を２．０㎜とし、周縁部１１又は６の幅wを２．０㎜とし、その他の部分の肉厚t_1を０．８㎜とした。この周縁部１１又は６は上下に突出する例を示す。周縁部１１と６を溶接した後は、外面

は研磨を施し面一にするが、内面は切断して調べると若干の盛り上がりが溶接部２０に生ずる。

【００１２】図５は、内側にのみ周縁部１１又は６が突出した例を示すものであり、肉厚t_1は０．８㎜、肉厚t_2は２．０㎜、幅wは２．５㎜とした。肉厚t_1は０．５～１．０㎜程度が好ましく、肉厚t_2は１．５～２．５㎜程度が好ましい。また幅wは２．０～３．０㎜程度が好ましい。

【００１３】ヘッド本体１ならびに別体部材１０を形成する金属材料としては、アルミニウムの合金が好適に使用できる。また、ヘッド本体１をアルミニウムの合金で形成し、ソール部５の一部を形成する別体部材１０としては、例えばアルミニウムの合金よりも比重の大きな別の金属材料で形成することもできる。さらに、溶接後のヘッド体積は２７０cc以上である場合に効果的である。最大体積としては３３０cc程度である。

【００１４】溶接後研磨を施した後には、陽極酸化被膜処理を行うとヘッドが強化される。ヘッドをアルミニウムの合金で形成した場合、陽極酸化被膜処理を施すと、表面硬度が上がり（ビッカース硬度１８０Ｈｖ以上）、傷付きにくくなり、かつ腐食防止を図れる。陽極酸化被膜を形成した後に、この被膜上に塗装被膜を形成することが好ましい。

【００１５】

【発明の効果】以上説明したように、この発明によれば、ヘッド本体の別体部材が溶接される個所の周縁部と別体部材の周縁部との肉厚をフェース部を除く周縁部以外の肉厚よりも厚く形成したので、強度が要求されない個所の肉厚を極力薄くしてヘッドの大型化を図ることができ、溶接個所には肉厚の周縁部が形成してあるため、溶接も確実に行われる。特に、ヘッド本体を形成する金属材料はアルミニウムの合金であって、ヘッド体積が２７０cc以上であるものにあっては、肉厚の周縁部同士を溶接することで、溶接のヒケによる割れも生じることなく、ヘッド本体のフェース部を除く部分の肉厚を極力薄くしてヘッドの大型化が重量を増大することなく図れる。

【図面の簡単な説明】

【図１】この発明の第１実施例を示す断面図。

【図２】ソール部側から見た図。

【図３】第２実施例を示す断面図。

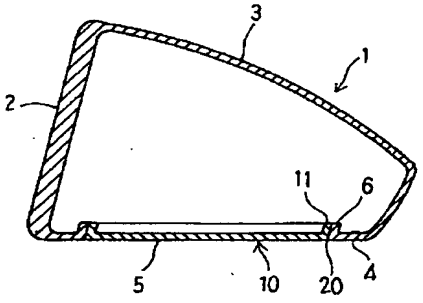
【図４】別体部材もしくは別体部材と溶接される個所のヘッド本体の拡大断面図。

【図５】図４と同様の拡大断面図。

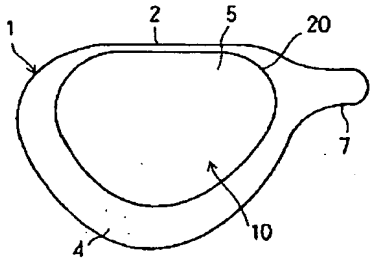
【符号の説明】

１　ヘッド本体
２　フェース部
３　クラウン部
４　周辺部
５　ソール部
６，１１　周縁部
１０　別体部材

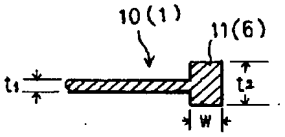
【図１】



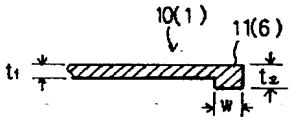
【図２】



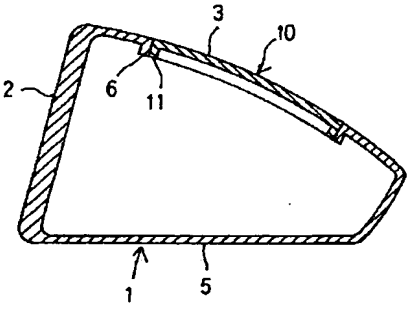
【図４】



【図５】



【図３】



Sole

Crown

フロントページの続き

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CONCISE EXPLANATION OF THE REFERENCE

1. JP-A-09-248353:

Brief summary of the invention

In order to achieve the above-mentioned object of the invention, there is provided a wood type golf club head having a metallic body in which a predetermined area of either in the crown portion or in the sole portion is formed into a separate metallic member to be welded to the portion of said metallic body corresponding to said predetermined area, wherein the thickness of the edge portion of the head body to where the separate member to be welded integrally and the thickness of the edge of the separate member are larger than that of the other portions of head body except for the face portion.

Detailed description of the preferred embodiments

Below, embodiments of the present invention are described in greater detail by referring to the drawings.

In an embodiment of the invention shown in FIG.1, a wood type golf club head made of metallic material comprises: a head body 1 having a face portion 2, a crown portion 3 and a peripheral portion 4; and a separate member 10 welded to the head body 1 which forms a predetermined area in a sole portion 5. The thickness of an edge portion 6 of the head body 1 to where the separate member 10 is welded integrally thereon and the thickness of an edge portion 11 of the separate member 10 are set both larger than that of other portion of the head body 1 except for the face portion 2. The head body 1 may be manufactured into a desired configuration and thickness by means of casting, for example, by lost wax casting. The thickness of the face portion 2 where strength is most required is made larger, and the

thickness of the other portion such as the sole portion 5, the crown portion 3 or the peripheral portion 4 is made small.

FIG.2 shows a bottom plan view of the head body as viewed from the sole portion 5 side, there is provided a welding range 20 and a hosel portion 7 which is formed integrally with the head body 1. The present invention can also be adapted to the type of the head body without the hosel portion 7 so-called a through bore type head body, in which the shaft is running through the head body 1, and to the type of the head body without the crown portion 3 .

In the embodiment of the invention shown in FIG.3, there is illustrated a head body with its predetermined area of the crown portion 3 formed with a metallic separate member 10. Preferably, the thickness of the edge 11 of the separate member and the thickness of the edge 6 of the head body 1 to where the separate member is to be welded integrally are both made larger than that of the other portions.

FIG.4 shows in an enlarged scale the cross section of the separate member 10 or the portion of the head body 1 where the separate member 10 is welded. The thickness t2 of the edge portion 11 or 6 is set to be 2.0mm, the width w of the edge portion 11 or 6 is set to be 2.0mm, and the thickness t1 of other portions is 0.8mm. As an example, the edge portions 11 and 6 are made protruded in a direction of up and down. After the edge portions 11 and 6 having been welded together, the surface is ground to be a flat plane. However, some protuberances formed on the inside surface of the welding portion 20 can still be seen from the cross section.

FIG.5 shows an example that the edge portion 11 or 6 is made protruded toward inside only. Thickness t1 is set to be 0.8mm, thickness t2 is 2.0mm, and width w is 2.5mm. Thickness t1 is preferably set to be in a range of 0.5mm~1.0mm, thickness t2 is preferably in a range of 1.5mm~2.5mm, and width w is preferably in a range of 2.0mm~3.0mm.

The head body 1 and the separate member 10 can be made

from metal materials, preferably an aluminum alloy. It is also possible to make head body 1 from aluminum alloy, and to make the separate member 10 ,that form a portion of the sole 5 from the other materials having larger specific gravity than aluminum alloy. Furthermore, it is advantageous when the volume of head body after the welding process is more than 270cc. The biggest volume should be about 330cc.

After having been welded and grounded, the golf club head will be treated with anodic oxidation so as to form a film thereon and thus be strengthened. When the golf club head is made from an aluminum alloy and treated with anodic oxidation to form a film thereon, the hardness of its surface will increase(the Vickers hardness will be up to or over 180Hv). Thus it is not easy for the surface of the golf club head to be damaged and eroding can be prevented. It is preferable to form a coating on the film formed on the surface of the golf club head after anodic oxidation.

In the invention, as described above, since the thickness of the edge portion of the head body to where the separate member is to be welded and the thickness of the edge of the separate member are both made to be larger than the thickness of other portions of the head body except for the face portion, the thickness of the portions where strength is not required can be formed as thin as possible so as to get a large-scale golf club head. In addition, since thick edge portion are formed in the welding range, welding can be carried out reliably. Particularly, when the metal material for making the head body is an aluminum alloy and the volume of which is up to or over 270cc, by welding the thick edge portions together, there are no cracks occured by the shrinkage generated during the welding process . Thus the thicknesses of all portions of the head body except for the face portion can be made as thin as possible so as to obtain a large-scale golf club

head without increasing its weight.

2. JP-A-09-99121:

Background of the invention

When a golf club head is expected to have a large size, the thickness of a sole portion will be formed, though different depending on the materials used , less than 1mm, preferably less than 0.8mm. However, if the thickness of the sole portion is less than 1mm, a crack may occur easily by the shrinkage generated during the process in which the edge part of the sole portion is welded to the body portion.

Summary of the invention

Therefore, the object of the invention is to provide a golf club head in which the welding between the body portion and the sole portion may be performed reliably without increasing the weight of the whole sole portion.

In order to achieve the above-mentioned object of the invention, there is provided a wood type golf club head in which a sole portion and the other body portions are manufactured separately , and the edge of the sole portion is welded to the body portion integrally, wherein in order to reduce the body weight, the thickness of a center part other than the edge of the sole portion is made to be less than 1mm, and the thickness of the edge of the sole portion is made to be thicker than that of the center part.

Detailed description of the preferred embodiments

Below, embodiments of the present invention are described in greater detail by referring to the drawings.

In FIG.1 which shows a cross section view of a golf club head made of metal material, there is provided a sole portion 1 and a body portion 2 manufactured separately. Additionally, said sole portion 1 is welded to said body portion 2 integrally. The body portion 2 includes a face portion 21, a crown portion 22 and a tail portion 23. The body portion 2 may be manufactured into a desired configuration and thickness by means of casting, for example, by lost wax casting. The thickness of the face portion 21 where the strength is most required is made larger, and the thickness of the crown portion 22 is made small. In the sole portion 1, the thickness of the edge part 11 is formed larger than that of the center part 12.

FIG.2 shows in a bottom plan view the head comprising a welding portion 3, a hosel portion 24 which connects with the body portion 2 integrally, and a peripheral portion 25 of the body portion 2. The present invention can also be adapted to the type of the head body 2 without the hosel portion 24 so-called a through bore type head body , in which the shaft is running through the head body, and also to the type of the head body without the crown portion 22.

As shown in FIG.3, the sole portion 1 to be welded to the body portion 2 includes an edge part 11 and a center part 12. Additionally, the thickness of said edge part 11 is larger than that of said center part 12.

FIG.4 is a cross section view taken along lines A-A of FIG.3. The thickness t1 of the center part 12 is set to be 0.5mm, the thickness t2 of the edge part 11 is set to be 2.0mm, and the width w of the edge part 11 is set to be 2.0mm. The edge part 11 is protruded in a direction of up and down.

FIG.5 is another cross section view taken along lines A-A of FIG.3. In FIG.5, the edge part 11 is merely protruded downward. The thickness t1 of the center part 12 is set to be 0.8mm, the thickness t2 of the edge part 11 is set to be 2.0mm, and the width w of the edge part 11 is set to be 2.5mm. The thickness t1 is preferably in a range of 0.5mm~0.8mm, the thickness t2 is preferably in a range of

1.5mm~2.5mm and the width w is preferably in a range of 2.0mm~3.0mm. Furthermore, the thickness t2 of the edge part 11 is equal to or more than that of the end portion of the body portion 2 to be welded to said edge part 11.

Many kinds of materials can be used to produce the body portion 2 and the sole portion 1, such as stainless steel, titanium or a titanium alloy, aluminium or an aluminium alloy, and a magnesium alloy or a cuprum alloy. In addition, the materials used for the body portion 2 can be different from those used for the sole portion 1. Furthermore, no problem will arise even if the materials used for the face portion 21 are different from those used for the other portions of the body portion 2.

As described above, since the thickess of the center part other than the edge part of the sole portion is less than 1mm according to the present invention, and since the edge part of the sole portion is thicker than the center part so as to reduce the weight of the golf club head, welding provided between the sole portion and the body portion may be carried out reliably without increasing the weight of the sole portion.

Brief description of the drawings

FIG.1 is a cross section view of the preferred embodiment of the invention.

FIG.2 is a bottom plan view of the head shown in FIG.1.

FIG.3 is a bottom plan view showing a sole portion only.

FIG.4 is a cross section view taken along lines A-A of FIG.3.

FIG.5 is a cross section view similar to FIG.4, in which the edge part is different from that shown in FIG.4.

Description of the reference numerals

1 sole portion

2 body portion

11 edge part

12 center part

3. JP-A-08-126723:

Detailed description of the preferred embodiments

FIG.1 is a cross section view of a wood type golf club head according to an embodiment of the invention, which comprises a hollow head body 1 made of metal material . The hosel portion 2 connected to the head body 1 for connecting with a shaft does not belong to the head body 1. There is also a different type of golf club without the hosel portion 2. In this case, the shaft is inserted into the head body 1 directly. The head body 1 includes a face portion 11, a sole portion 12 and a crown portion 13. In this embodiment, portions except for the crown portion 13 are manufactured by casting or forging, and the crown portion 13 will be secured by welding or the like in a following process. In this embodiment, the whole head body 1 is produced by magnesium alloy . The thickness of the face portion 11 is above the range of 5~7mm, the thickness of the sole portion 12 is more than 1.5mm, and the thickness of the crown portion 13 is the smallest. In this embodiment, the hosel portion 2 is also formed of magnesium alloy. The vertical axis extending straight up from the center of the gravity G of the head body 1 is Y axis, the axis perpendicular to Y axis is Z axis, and the axis in parallel with the plane of the face portion 11 and passing through the drawing paper's plane perpendicularly is X axis. Thus, the inertia moment around X axis is set to be more than $17g \cdot m \cdot S^2$, and the inertia moment around Y axis is set to be more than $28g \cdot m \cdot S^2$. The reason why the inertia moment is set so is because thus ball's fly direction can be made steady and the fly distance of the ball can not be shortened easily even when the ball is hit at a portion offset from the center part of the ball. If the inertia moment around X axis or around Y axis is less than the values

mentioned above, the ball can not fly stably in its direction and a large carry also can not be obtained in the case of that the ball portion offset from the center part is hit . Thinning down the thickness of the crown portion 13 in order to reduce the weight of the head makes it possible to lower the center of gravity of the head body 1 . In addition, the thicknesses of the sole portion 12 and a side portion 14 connecting the sole portion 12 and the crown portion 13 are the same as that of the crown portion 13, preferably in a range of 1.2~2.5mm, or larger than that of the crown portion 13. According to the embodiment shown in FIG.1, since the hosel portion 2 and the head body 1 are formed of magnesium alloy by means of a lost wax process or the like,the centre of gravity can be made smaller, the volume of the head body 1 can be in a range of 200~350cc and the sweet area can be enlarged. Even if the volume of the head body is set to be in a range of 200~350cc, the weight of the head body 1 can be controlled in a range of 130~210g.